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Blockchain's Influence on Digital Marketing (DM): Consumer Behavior in Retail Sector

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Abstract: Examining the possible advantages and disadvantages of using Blockchain technology in digital marketing (DM) is undeniably a critical matter. The principal objective of this research is to examine the function of blockchain technology in digital marketing, taking into account its implementations in DM drawbacks, and current adoption rate. The primary objective of the study is to furnish industry professionals and decision-makers with strategic data on blockchain influence on DM more precisely the key elements influencing retail consumer behavior. The data was gathered through online questionnaires with a sample size of 300 people who played in respondent's purchasing decision a representative from a range of educational background was questioned. The study emphasizes the enormous impact Blockchain technology has on consumers behavior especially in retail markets. These priceless insights can help companies and marketers comprehend and successfully target their desired market.

Keywords: Blockchain, Technology, Influence, Adaptation Rate, Consumer

JEL Classification: M1, M3, M31

1. Introduction

Unlike traditional marketing, digital marketing aims to supply customers with relevant material, foster long-term connections, and serve as a means of communication. Digital outreach is "a collaborative and adaptive process working together with customers and partners where value is jointly created, communicated, delivered, and sustained to all stakeholders," (Langan at al, 2019). Furthermore, the full discipline of digital marketing encompasses analytics, eCommerce, mobile marketing, and consumer data mining (Pärssinen et al, 2018). Businesses today and their marketing mix have been affected by data explosions encompassing rivals, consumers, and markets, while the digital age has also transformed the way customers and businesses engage (Pärssinen et al, 2018).

Although there is significant awareness, the blockchain use in digital marketing is still in its early stages.

According to Dobrovnik et al (2018) the marketing element of blockchain is predicted to be both advantageous and disadvantageous to the marketing business. According to Ertemel, the key aspect of this technology is that it allows people to take control of their data and provides a better knowledge of how users engage with companies (Dobrovnik et al, 2018).

Blockchain technology Block Chain Technology (BT) offers a lot of promise to monitor and track supply chain activities and provide players greater insight to make choices by giving business options like enhancing the supply chain and decreasing non-value-added processes, time, and costs. (Zhi et al, 2020).

BT is a distributed ledger technology that allows each player in a distributed network to have a copy of an immutable ledger of transactions that can be conducted without the intervention of middlemen or third parties. This implies that blockchain might provide businesses more access over their inventory and allow them to better regulate their sell or purchase activities.

The retail industry sees potential in using BT to improve traceability and support retail and e- commerce sector by enabling more visibility and enhancing business models and store fulfillment (Lenny et al, 2020), indeed blockchain applications for retailers are based on permission ledgers, evaluated and confirmed by miners, which ensures traceability and security (Francisco et al, 2018).

2. Aim of the study

This study focuses on BT implementations in DM and how the emerge of BT extended from being used in finance in the first place to cover afterward all areas including retail market. Moreover, the main goal is showing that BT can bring trust among users and online venders which leads to higher levels of purchase intentions.

The study aims to shed the light on the influence of BT on digital marketing among retail consumer to understand better the key elements behind their behavior change. All in all, this well help marketers acknowledge the targeted consumer tranche they want to impress therefore they will consider adequate tactics and strategies that go along with their marketing goals.

3. Literature Review

With the increased usage of the internet, marketers were able to instantly reach customer through social media. Marketing management has shifted from traditional management techniques to digital platforms. Digital marketing has made it simpler for digital businesses to meet the demands of a competitive market. Blockchain has changed the marketing mix and the way we handle marketing initiatives by implementing new technologies. Blockchain may increase transparency in data-driven marketing by verifying and analyzing each consumer's journey through verified ad delivery, ensuring that a genuine person viewed the ad in accordance with the terms of a media contract. Marketers will be able to control how their assets are delivered by monitoring where their ads are placed, reducing ad fraud from automated bots by ensuring that real followers and consumers engage with their ads, and ensuring proper ad engagement tracking, which will lead to more precise digital attribution (Ghose, 2018).

3.1. Blockchain Technology

Blockchain is one of the most significant technological advancements in recent years. Blockchain is a transparent money exchange technology that has altered the way businesses are run. Companies and software behemoths have begun to spend heavily in the blockchain sector, which is anticipated to be worth more than $3 trillion over the next five years. It is becoming increasingly popular due to its unrivalled security and capacity to give a comprehensive answer to digital identification concerns. This is a digital ledger in a peer-to-peer network (Sarmah, 2018).

Blockchain is an electronic distributed ledger (Watten Hover, 2017) represents a collection of record linked with each other as a chain strongly resistant to alteration and protected using cryptography through keys that can be encrypted and decrypted, these virtual blocks hold users' information and transaction details, each block takes references from the previous one shared by all users, and the data within the blocks is encrypted by complex algorithms, making hacking impossible, and the brilliant feature of blockchain has led to the development of more than 1600 cryptocurrencies.

Satoshi Nakamoto is considered as the creator of blockchain technology, having published a paper on bitcoin titled "Bitcoin: A Peer-to-Peer Electronic Cash System," in 2008. The study's abstract focusses on direct online payments from one source to another, eliminating the need for a third party. The paper described an electronic payment system based on the notion of cryptography. Nakamoto's paper presented a solution to double spending in which a digital currency cannot be duplicated, and no

one can spend it more than once. The paper established the concept of a public ledger, which allows the transaction history of an electronic coin to be recorded and confirmed, ensuring that the coin has not previously been spent and avoiding repeated spending (Nakamoto, 2018).

3.2. Development of Blockchain Technology

In less than a decade, blockchain technology has seen three generations prepping for the fourth, with AI and digital intelligence.

Swan (2015) decides the development of BT into three distinct periods; Blockchain 1.0 refers to the use of blockchain to transmit currency. Blockchain 2.0 refers to the transmit currency, and finally Blockchain 3.0 applies to digital applications that go beyond money and markets for instance governance, smart cities, education and others.

3.3. Marketing and Blockchain

Antoniadis (2020) estimates blockchain adoption would affect over 50 industries' business strategy and operations. Due to near-real-time digital asset transfers, it can execute contracts without middlemen and securely store data across economic operations. Blockchain technology promotes peer-to-peer networking, which disrupts corporate processes by increasing direct marketing and removing clean data source middlemen, saving money. Digital marketing promotes customer outreach, long-term connections, and changing needs. Companies create, convey, generate, and sustain value for customers and partners through digital marketing. Digital marketing covers social media, internet, analytics, e-commerce, and consumer data mining (Arora et al, 2019).

Blockchain is rapidly transforming various sectors. Although its effects go beyond money and banking, ‘blockchain’ is commonly associated with them. Blockchain is frequently connected with money, therefore many wonder how it might be used in marketing. Marketing may benefit from blockchain. Blockchain helps marketers manage customer requests, generate new data uses, and improve advertising (Salha et al. 2019). To fix digital marketing issues without Blockchain. Blockchain verifies where an item was created, the soil used, and worker wages. Today's customers value product integrity and the company and process that creates them (Sheth, 2002).

3.4. How BT Affects Marketing

The breakthrough in blockchain technology will have far-reaching implications for marketing professionals and advertising. According to marketing research, digital

marketing is the most successful way to interact with and engage consumers. Many businesses presently use third-party data sharing platforms, such as Facebook, to get client information. By employing Blockchain technology, retailers may be able to incentivise customers to give personal information by offering micropayments, removing the need for a third party. In today's marketing scene, trust is the most important issue. In an e-commerce setting, it is critical. A lack of perfect confidence between the parties reduces the overall amount of online commercial transactions that may be undertaken. Despite substantial efforts, the adoption of e-commerce has remained low. Given that trust is an important part in online platforms. Blockchain technology is designed to combat scepticism on several levels (Verhoef et al, 2010).

In 2020, blockchain is a solution to all advertising issues. Theoretical principles are being replaced with proven solutions that address transparency, efficiency, and fraud prevention. Identity verification applications are becoming more tangible. Blockchain technology affects marketing at so many different areas namely BT is considered as a method for distributing rewards. Next, BT enhanced the advertising value chain and also validated Data for customer insights as well as BT focused on content distribution. Finally, BT helps marketers find qualified publishers in a clear and trustful manner (Sharma, 2021).

3.5. Impact of Digitalization on Consumer

Consumer behaviour is the study of human responses to products and services. It investigates how people allocate resources to consumption-related items (George, 2016). Recent advances in digital technology are causing significant and unprecedented alterations in many aspects of our social and economic lives, fundamentally altering our ways of communication, creativity, and consumption. This phenomenon is known as "digitalisation." Digitalisation is thought to have a substantial influence on the economy, personal lives, and society.

3.6. Consumer Buying Behaviour

According to Kotler et al. (2013), consumer purchase behaviour is a multifaceted process driven by cognitive, emotional, and behavioural factors. Psychological elements according to Kotler et al. (2013), consumer purchase behaviour is a multifaceted process driven by cognitive, emotional, and behavioural factors. Psychological elements such as attitudes, learning, perception, and motivation all impact decision-making. Family, peers, social position, and culture all have an impact on choices (Schiffman & Kanuk, 2010) as attitudes, learning, perception, and motivation all impact decision-making.

Family, peers, social position, and culture all have an impact on choices (Schiffman & Kanuk, 2010).

3.7. Decision Making Process

The decision-making process is critical for predicting how customers would react to used-item internet marketing (Ray, 2019). A need must be established initially, followed by a search for information via social media and personalised marketing (Ha & Lennon, 2019). Digital marketing has an influence on brand identification, sentiment, and purchase intent (Hofacker et al. 2016). Second-hand stores may boost and widen their online presence by implementing these strategies.

3.7.1. EKB Model

The Engel-Kollat-Blackwell (EKB) Model of Consumer Behaviour describes how customers make their decisions. It was originally used in 1968 and considers internal factors, information processing, external impacts, and decision-making procedures. It enables businesses to tailor their marketing to client preferences (Celik, 2016). This model is particularly relevant in the digital era, where consumers are bombarded with information across multiple channels. In the context of blockchain-enhanced digital marketing, the EKB model helps explain how consumers progress from problem recognition to post-purchase evaluation when presented with transparent, secure, and data-protected advertisements. Blockchain can influence the information search and alternative evaluation stages by enhancing trust and reducing skepticism (Sarmah, 2018; Verhoef et al., 2010). Therefore, companies utilizing blockchain technologies can use the EKB model to identify where trust-building mechanisms are most effective in the digital journey, especially in the retail sector (Sharma, 2021).

3.7.2. Howard-Sheth Model of Consumer Behaviour

The Howard-Sheth Model explains consumer behaviour through three elements: input (external variables), intervening (psychological processes), and output (consumer reactions). It helps marketers understand the complex interaction between internal and external elements that influence consumer decisions (Prakash, 2016). In blockchain-based digital marketing, this model becomes instrumental in analyzing how input factors such as secure data exchange, verified product information, and peer reviews influence consumers' cognitive processes like perception and learning. The intervening variables—especially trust and motivation—are deeply impacted by blockchain's promise of authenticity and tamper-proof data (Dobrovnik et al., 2018; George, 2016). As a result, the outputs, such as brand loyalty or repeat purchases, may be positively affected by a heightened sense of transparency. The model thus provides a robust framework for

evaluating how blockchain shifts consumer behavior from passive browsing to active engagement and confident decision-making (Salha et al., 2019).

4. Methodology

The methodology section outlines a descriptive study designed to examine the influence of blockchain technology on digital marketing and its effect on consumer behavior in the retail sector. A cross-national approach was employed, targeting respondents aged 18–60 from Turkey and Algeria, using random sampling to ensure demographic diversity. The study investigates how blockchain's features—such as transparency, data safety, and trust—impact consumer perceptions, moderated by factors like education level and prior knowledge of blockchain. A comparative model was used, with country as an independent variable and consumer trust and perceived data security as dependent variables. Two hypotheses proposed significant perceptual differences between Turkish and Algerian consumers, but t-test results revealed no statistically significant differences. Despite expectations, both consumer groups showed similar positive attitudes toward blockchain's potential in enhancing digital marketing transparency and security.

4.1. Aim

The aim of this research is to investigate the influence of blockchain technology on digital marketing practices and its subsequent impact on consumer behaviour in the retail sector. Specifically, this study seeks to examine how consumer perceptions, trust, and awareness of blockchain technology shape their engagement with digital marketing strategies, focusing on the roles of data transparency, security, and integrity in enhancing consumer confidence and trust in digital marketing. The research aims to explore how the adoption of blockchain can address concerns related to data manipulation and protection, thereby influencing consumer decision-making and interaction with online retailers.

The sampling for this research would involve a random sample selection of participants from two countries: Turkey and Algeria. Focus would be on the age bracket 18 to 60 years, aimed at representing a representative cross-section of the adult population covering all age groups and other socioeconomic backgrounds. A method of random sampling tends to increase the generalization capability of the results due to reduced selection bias and inclusion of diversity within the samples. Both countries were selected based on their unique cultural and socioeconomic contexts, which give a comparative insight into the research objectives. Research Objectives are as below:

- To analyse the demographic and background characteristics of respondents and understand their perceptions about block chain technology and trust in digital marketing.
- To investigate how demographic variables, including education level, affect perceptions of block chain's potential benefits for transparent and tamper-proof data handling.

These objectives come together to provide an exhaustive understanding of the role played by block chain technology in transforming digital marketing and impact on retail consumer behaviour.

4.2. Research Model

The ideas of technology acceptance and trust-building mechanisms in digital settings serve as the foundation for this study. The approach is based on the notion that blockchain technology provides security and transparency, both of which are essential for building customer and company confidence. Comparative cultural and demographic studies, which highlight geographical variations in how people perceive technology, also shape the theoretical foundations. The research model is figured as Figure 1.

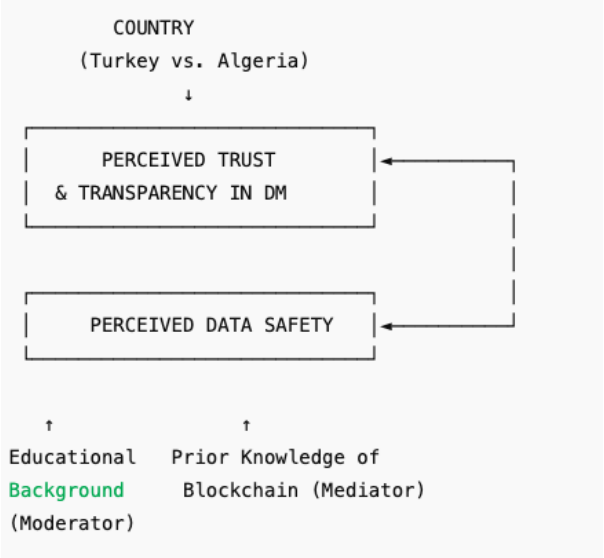

Figure 1. Research Model

The following are the independent variables: Country (Cultural/Demographic Group): Algeria vs. Turkey.

DV (dependent variables):
Perceived Transparency and Trust: The degree of trust that blockchain creates between the online shop and the customer.

Perceived Data Safety: The extent to which users feel comfortable knowing that blockchain protects the metadata.

Moderating/Mediating Factors: One variable that affects how people see blockchain technology is educational background.

Pre-understanding of Blockchain Technology: The connection between nation and dependent variables may be mediated by knowledge of blockchain technology. The purpose of this research model is to describe and evaluate the correlations between variables without proving causation, which makes it a Descriptive model.

4.3. Research Question:

What is the difference in perceptions regarding how blockchain technology can make handling consumer data more transparent and secure between consumers in Turkey and those in Algeria?

4.4. Hypothesis:

H1: There is a high distinction between Turkish and Algerian consumers in terms of their notion that blockchain technology can improve trans activity and trust between consumers and online retailers.
H2: Consumers in Turkey and Algeria differ greatly regarding the opinion that consumer data (metadata) can safely be put on a blockchain.

4.5. Results:

Independent samples t-test for the question: "Do you believe Blockchain technology could provide more transparency and trust towards the relationships between consumers and online retailers?" reveals no statistical difference in Turkish ($M = 1.25$) and Algerian consumers ($M = 1.20$, $t(84) = 0.266$, $p = 0.791$) as seen in table 1. In other words, both consumer groups agree about the ability of blockchain technology to promote greater transparency and trust with digital marketing, and so the hypothesis is not valid.

For the question "Do you feel that consumer data or its attributes (metadata) can be safely placed on a blockchain?", the results seen in table 2 also show no significant

difference (t (84) = 1.003, p = 0.319). This shows that both Turkish and Algerian consumers perceive the safety of placing data on a blockchain similarly, and the hypothesis is not supported.

Both hypotheses could not be supported since differences between Turkish and Algerian consumers in their beliefs about how blockchain can enhance transparency, trust, or data safety in digital marketing were nonsignificant.

Table 1. Group Statistics

	Country	N	Mean	Std. Deviation	Std. Error Mean
Do you believe Block chain technology could provide more transparency and trust towards the relationships between consumers and online retailers?	Turkey	4	1.25	.500	.250
	Algeria	82	1.20	.399	.044

Table 2. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Conf. Int. of the Diff.	
									Lower	Upper
Do you believe Block chain technology could provide more transparency and trust towards the relationships between consumers and online retailers?	Equal variances assumed	.239	.626	.266	84	.791	.055	.206	-.355	.465
	Equal variances not assumed			.216	3.189	.842	.055	.254	-.727	.836
Do you feel that consumer data or its attributes (metadata) can be safely placed on a blockchain?	Equal variances assumed	1.068	.304	1.003	84	.319	.232	.231	-.228	.691
	Equal variances not assumed			.791	3.177	.484	.232	.293	-.672	1.135

4.6. Limitations and Future Recommendations

The current study has a few limitations mainly in context with the sample size and the time frame. First, the study was conducted only in the regions of Algeria and Turkey. In the future, another sample could be taken from other European and North African

countries such as France, Morocco, and Tunisia. This will help understand the topic better and in detail since it is going to cover other regions and might have a bigger sample size. Second, this study did not focus on a single retail firm, even though doing so would allow a finely tuned study of industry specific DMCs regarding the firm performance. In future, studies can be conducted that will solely be focusing on one factor at a time and will provide in-depth research for the specific variable or factor. Third, this study used a quantitative approach to test the hypothesis. Although, quantitative approach is considered the most effective and influential research approach, however, In the future, both quantitative and qualitative approaches can be employed. For international marketing and the Omni-channel structure, there is still a need for more conceptualization of DMCs.

5. Conclusion

The goal of this study is to see if blockchain technology can make digital marketing more trustworthy and transparent. Through the use of regression analysis, some variables were found to significantly impact the belief that blockchain would improve the relationships between consumers and online retailers. The key predictors would include perceived accuracy and security of blockchain technology, perceived belief in the safe storage of consumer data on a blockchain, and the nature of data as being unalterable. These results point out that those individuals who view blockchain as secure and reliable in data management will have increased trust for transparency in digital marketing.

Significance Data integrity concerns also emerged with respect to data integrity that would impact the marketing plan. The higher the extent of frequency marketing professionals feel over data integrity, the stronger is their belief in enhancing transparency using blockchain. Interestingly, the belief in the ability of blockchain to track data management actions has affected it negatively, implying granular tracking of data action is one of the important functionalities of blockchain but creates unease about privacy or more surveillance, reducing trust sometime.

In conclusion, the findings emphasize how blockchain technology can help unlock great potential to improve the transparency and trust levels for digital marketing purposes due to its promise of security, accuracy, and immutability of data. The research, however, further found that there exists a somewhat intricate relationship between the feature characteristics of blockchain and perceived effectiveness in consumer-retailer relationships, with some factors, like tracing the data, perhaps weakening those

benefits. Future research could include a greater examination of how these different relationships play into each other and how openness can balance consumer privacy considerations in digital marketing.

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